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Re:	Application of:	Goller et al.
	Serial No.:	10/775,748
	Filed:	February 10, 2004
	For:	Method and Arrangement for Contacting Terminals
	Group Art Unit:	2814
	Confirmation No.:	8728
	Examiner:	Abul Kalam
	Our Docket No.:	1890-0054

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal. The review is requested for the reasons stated on the attached sheets. This paper is filed by the Attorney of Record.

I. Reasons for Review

The Examiner has failed to establish that claims 12-29 are unpatentable under 35 U.S.C. §103(a). In general, the *clear error in the Examiner's rejection* is in regarding the limitations “a single step of filling” and “integrally formed” as not having patentable weight because they are product by process limitations. (April 5, 2007 Final Office Action at p.2). In addition, the *clear error in the Examiner's rejection* is in determining that the limitations “a single step of filling” and “integrally formed”, when treated *as* having patentable weight, are nevertheless obvious modifications of the primary cited reference. (March 30, 2007 Office Action at p.2).

A. No Patentable Weight

All of the claims include one of the limitations “wherein a second recess extends to the second terminal surface through the first and second insulating layers, and is filled with *an integrally-formed third conductive material*”, or “wherein a second recess extends to the second terminal surface through the first and second insulating layers, and is filled with a third conductive material; and *wherein the third conductive material is formed in a single step of filling*”. The combination of references proposed by the Examiner is *structurally* different than the claimed invention. To this end, it is noted that the Examiner has implicitly admitted that the proposed combination does not include a third conductive material as claimed that is either “integrally-formed” or “formed in a single step of filling”. (Final Office Action at pp.4, 5 & 8).

Instead, the Examiner has in one argument determined that the limitations are product by process limitations, and therefore has disregarded the limitations giving them no patentable

weight. The Examiner has not correctly applied the rule concerning product by process limitations, however. In particular, the Examiner has failed to consider the “structure implied by the process steps”. M.P.E.P 2113, citing *In re Garnero*, 162 USPQ 221, 223 (CCPA 1979). In this case, the “integrally-formed” third conductive material would clearly “be expected to impart distinctive structure characteristics to the final product.” (*Id.*) Similarly, the third conductive material formed by a single step of filling would clearly “be expected to impart distinctive structure characteristics to the final product. (*Id.*) Thus, such product by process limitations have patentable weight. (*Id.*)

An example of this claimed feature is disclosed in Fig. 2H as well as in page 13, lines 29-31 of the present application. In this example, the material 235 of the terminal 239 is uniformly created in a single pass, resulting in an *integrally-formed* structure. (Present Application at Fig. 2H). In Pasch, the Examiner considers the contact material within the vias 134, 154 as constituting the “third material”, although such contact material is clearly formed as two pieces in multiple filling steps. (See Pasch at col. 7, lines 41-67).

The difference between the integrally formed structure and the separate filled vias 134, 154 is significant. As an integrally formed structure, the claimed third conductive material has several structurally related advantages. An integrally-formed contact structure helps ensure the integrity of the electrical contact and limits the possibility of introduction of defects into surrounding material. An integrally-formed conductive structure has a reduced contact resistance when compared to multiple contact plugs arranged on top of each other.

Thus, the differences between the claimed integrally-formed third conductive material and the prior art multiple stacked plugs are structural, and significant. Because the use of an “integrally-formed” third conductive layer, or a third conductive layer “formed in a single

step of filling” would be expected to impart distinctive structural characteristics to the final product as noted above, the Examiner has erred by giving this limitation no patentable weight. (See *In re Garnero*, 162 USPQ 221, 223 (CCPA 1979).

B. Obvious to Modify to Integrally Formed Contacts

The Examiner stated that even if the terms “integrally-formed” and “formed in a single step of filling” were given patentable weight, that modification of Pasch to incorporate such features would have been obvious. (Final Office Action at p.5). The Examiner has stated “it has been held that forming in one piece of an article which has formerly been formed in two pieces and put together involves only routine skill in the art”. (*Id.*)

However, forming the contacts within the vias 134 and 154 in Pasch in a single step does *not* merely constitute replacing two parts with one. The contacts within the vias 134, 154 of Pasch are formed in separate steps because the vias 134, 154 are produced in separately formed layers 130 and 150 at different times. Accordingly, if the via 134 is not filled with a contact material *prior* to forming the layer 150, then the material of layer 150 would start to fill the via 134 as the layer 150 is formed. In such a case, the non-conductive material from the layer 150 would create a non-conductive blockage within the via 134. To avoid this problem, the via 134 must be filled with the conductive material *before* the layer 150 is formed.

In the alternative, it may be possible to form both layers 130 and 150, and then cut the vias 134 and 154 at the same time. After that, the vias 134 and 154 could be filled in a single step. The Examiner has not proposed this modification, however. Moreover, there is no reason to make these extensive modifications of Pasch. First, there is no teaching that it

would be possible or practical to fill the double via 134, 154 in a single step. In particular, the height to width ratio of the double via 134, 154 is very large. As a result, it may not be possible to form a reliable contact at such a deep depth with such a relatively narrow opening. Second, the layers 130 and 150 are used to form different connection paths, and thus naturally require separate filling steps. This is illustrated by the via 136 and the local interconnect 160, which form different connection paths in different layers 130 and 150. Such conductive elements are formed in separate steps. This clearly teaches that openings in 130 and 150 are filled with conductive material in separate steps.

Thus, there is no reason to modify Pasch to incorporate an integrally-formed conductive material as claimed, or to incorporate a conductive material formed in a single filling step as claimed. Regardless, the Examiner has not set forth a reason to modify Pasch in this manner.

II. Conclusion

Because the limitations “integrally-formed” and “formed in a single step of filling” represent significant structural differences and should be given patentable weight, and because the Examiner has set forth no reason to modify Pasch to incorporate conductive material as claimed, which is “integrally-formed” and/or “formed in a single step of filling”, it is respectfully submitted that the application is in a condition for allowance.

Respectfully Submitted,



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